

Detailed Analysis – Office and Data Center Changes Associated with the June 2010 Portfolio Manager Release

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This memo is supplemental to the Analysis of Expected Rating Changes memo, to provide expanded detail on Offices and Data Centers, and to offer specific information on some key partners in the commercial real estate and retail markets.

Offices and Building Size

The average change for all offices is not expected to be extremely large; an average of +1. However, this net average is misleading, because a large number of offices are unaffected by the changes (e.g. are below 200,000 square foot with no Data Center). Thus, it is useful to look at different sub-groups within the population of office buildings to understand trends.

The new floor area cap on the office model places a cap on all buildings with square foot above 200,000 square foot. Without this cap, buildings were getting an “allowance” for more energy as they got larger. But, looking at CBECS data and PM data, buildings that are 200,000 ft², 500,000 ft² and 1,000,000+ft² do not really have much difference in the average EUI. Therefore, this old adjustment was unnecessary. The cap is necessary to provide more equitable ratings for larger buildings.

Because the allowance for square foot in the benchmarking equation is proportional to size, the larger the building is, the larger a decrease is expected when the cap is put into place. **Table 1** presents the average rating change by square foot bin. This table demonstrates that the vast majority of Portfolio Manager Offices are smaller than 200,000 square foot. As expected, it also shows that larger rating drops are expected for larger buildings. The largest average drop (-8 points) is observed for the 796 buildings that are larger than 1,000,000 square foot.

Table 1 also demonstrates why the square foot cap was necessary, prior to the change; the buildings of over 1,000,000 square foot had an average rating of 73, well above their peers. With the model changes their rating is lower (65) though still above average.

Table 1				
Average Rating Old and New by Square Foot Bin				
SQFT Bin	Count of Buildings	Average of Old Rating	Average of New Rating	Average Change
0 to 200,000	32,682	55	56	1
200,001 to 400,000	4,297	69	71	2
400,001 to 600,000	1,516	72	71	-2
600,001 to 800,000	649	72	69	-4
800,001 to 1,000,000	398	72	67	-5
Over 1,000,000	796	73	65	-8
All Offices	40,338	58	59	1

Offices, Building Size and Data Centers

Looking at the information in Table 1, it is interesting to note that buildings up to 400,000 square foot are actually experiencing rating increases, not decreases. Also, there are still a number of office buildings (and bins) with very high ratings, in the 60s and 70s. This is because in addition to the square foot cap, there is also a new adjustment for Data Centers.

The old Data Center adjustment assumed that a Data Center had an EUI that was about 1-2 times the EUI of an Office. The EPA data collection effort and analysis has shown those old adjustments to be unduly punitive, as the average data center can use 10 times the average office, or more. With the new, more realistic Data Center adjustments, any building with a Data Center is much more likely to experience a rating increase and so there is an interactive effect between the building square foot cap and Data Center changes.

Table 2 presents the average rating change for each bin of building size, and for those buildings with and without Data Centers.

For buildings with Data Centers, the increase associated with the Data Center change often balances the decreases associated with the square foot bin. However, for larger buildings the negative effect of the square foot cap outweighs the positive effect of the new Data Center model. Thus, buildings of over 1,000,000 square foot with Data Centers still have a net decrease of -3 points.

Buildings over 200,000 square feet without a Data Center are very likely to experience a rating decrease, and the bigger the building the larger the decrease. Thus, while buildings that are 200,000 to 400,000 square foot without Data Centers experience an average change of -2 points; buildings over 1,000,000 without Data Centers experience an average change of -12 points. There are 415 buildings in this category.

Table 2						
Office Building Rating Changes by Size and Presence of Data Center						
SQFT Bin	Total Building Count	Average Rating Change	Buildings without Data Center		Buildings with Data Center	
			Average Change	Percent of Buildings	Average Change	Percent of Buildings
0 to 200,000	32,682	1	0	86%	8	14%
200,001 to 400,000	4,297	2	-2	57%	7	43%
400,001 to 600,000	1,516	-2	-6	56%	3	44%
600,001 to 800,000	649	-4	-8	55%	1	45%
800,001 to 1,000,000	398	-5	-9	59%	1	41%
Over 1,000,000	796	-8	-12	52%	-3	48%
All Offices	40,338	1	-1	81%	7	19%

Data Center Misclassification

As noted previously, there are still a lot of office buildings with relatively high ratings. As shown in Table 1, the average rating is 59 with some bins scoring closer to 70.

The new Data Center model is truly intended for sophisticated raised floor computing space with dedicated power and cooling. It is extremely likely that there are many buildings that are not using the Data Center category in a manner consistent with EPA's definition.

It is hard to identify specifically which Data Centers may be incorrectly classified as such in Portfolio Manager. **Table 3** presents a few possible classifications. Possible criteria for flagging incorrectly classified Data Centers are set according to size, hours of operation, and percent of floor area that is Data Center.

Table 3	
Possible Designations of Misclassification of Data Center	
Type of Data Center	Count in Sample
All Data Centers	5,873
Operation less than 144 Hours per week	353
Data Center $\leq 200 \text{ ft}^2$	362
Data Center ≤ 500	1,008
Data Center ≤ 1000	1,813
Data Center $\leq 2\%$ of Area	2,427
Data Center $\leq 5\%$ of Area	4,897
<i>Note: Counts are not exclusive or additive, one building may meet all categories.</i>	

The two most restrictive categories Data Center hours of operation below 144 hours per week (i.e. not 24 hours per day) and Data Center floor area less than 200 square foot. Data Centers with this low level of operation and small size are highly unlikely to meet the EPA definition. Interestingly, although the total number of Data Centers in each of these categories is similar, there is not a high degree of overlap. There are actually 660 Data Centers that are *either* less than 200 square foot *or* open fewer than 144 hours per week. Thus, it is **highly likely** that more than 10% of Data Centers are not correctly classified according to EPA definitions. Buildings with these Data Centers will be receiving unduly high ratings after the changes go through on June 7. These buildings may be contributing to higher ratings in some of the office size category bins presented above. These are the buildings that will need to go back and re-classify their space, deleting the Data Center and adding the Square Foot back in to the main building space.

Any building that is incorrectly using Data Center will see its rating go up on June 7; this is because the new Data Center allowance is more generous than the old. However, after the building is reclassified, its rating will decrease. The size of this decrease is mostly likely to *exceed* the original increase from June 7, resulting in a net rating decrease for the building. **Table 4** presents the average ratings and rating changes that could be expected both on June 7 and after the spaces are reclassified. The net change is approximately -2 or -3 points and the averages after reclassification tend to be in the low to mid 60s. For many of these buildings the reclassified score is probably the more accurate score.

Table 4 Potential Effect of Data Center Space Reclassification				
Criteria	Average Rating			Net Rating Change
	Starting	On June 7	After Reclassification	
All Data Centers	64	72	61	-3
Operation Less than 144 Hours per Week	58	66	57	-1
Data Center ≤ 200 ft ²	63	64	61	-2
Data Center ≤ 500 ft ²	65	67	63	-2
Data Center ≤ 1000 ft ²	66	68	63	-2
Data Center $\leq 2\%$ of Area	70	72	67	-3
Data Center $\leq 5\%$ of Area	67	71	64	-3

Finally, in addition to incorrect use of the Data Center space, there may also be some incorrect use of the office space. The larger Data Centers (those that are 5-10% of the total office floor area) tend to have average Office Worker Density and Office PC Density that are well above the typical range. One hypothesis is that these buildings are counting extra workers and computers in their offices space. They may be counting their servers in *both* their data center *and* office spaces (which would be double counting), or increasing both the worker and PC numbers to account for an imagined bias in the data center algorithms. In these cases there may be problems with how the *office* space is entered. The unusually high values for worker density and PC Density result in high ratings (and larger increases in rating).

Table 5 presents typical operational characteristics of all offices (with or without Data Center) as compared with those offices that have Data Center accounting for 0 to 5% of the floor area and those with Data Center accounting for 5-10% of the floor area. As shown, the buildings with Data Center of 5-10% have a very high rating increase, and have very high Office Worker Density and PC Density. The average new rating of 73 is probably inflated due to incorrect use of Data Center and/or Office space. It is hard to forecast how the ratings for these buildings would change if the Data Center and Office spaces were properly quantified. It is unclear whether the Data Center size is correct and it is unclear whether the office information is correct. Changes to both of these items would lower ratings.

Note that the Data Centers of 0-5% also have a high average rating, however many of these Data Centers fall within one or more of the categories presented above and therefore are also expected to have lower ratings after correct classification.

Finally, recall that buildings with Data Centers greater than 10% cannot earn ratings.

Table 5 Average Characteristics for Larger/Smaller Data Centers			
	All Offices	Data Center of 0-5%	Data Center of 5-10%
Count	40,338	4,897	976
Average Old Rating	58	67	51
Average New Rating	59	71	73
Average DC Size	7,606	3,970	20,966
Average Office Size	169,862	230,216	227,292
Average Office Worker Density	4.33	3.44	4.38
Average Office PC Density	3.12	3.86	5.12

Partner Summary

REDACTED – EX 4

Attachment

REDACTED – EX 4